

Analysing the employment effects of mergers and acquisitions

Lehto, Eero; Böckerman, Petri

Postprint / Postprint

Zeitschriftenartikel / journal article

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:

www.peerproject.eu

Empfohlene Zitierung / Suggested Citation:

Lehto, E., & Böckerman, P. (2008). Analysing the employment effects of mergers and acquisitions. *Journal of Economic Behavior & Organization*, 68(1), 112-124. <https://doi.org/10.1016/j.jebo.2008.03.002>

Nutzungsbedingungen:

Dieser Text wird unter dem "PEER Licence Agreement zur Verfügung" gestellt. Nähere Auskünfte zum PEER-Projekt finden Sie hier: <http://www.peerproject.eu> Gewährt wird ein nicht exklusives, nicht übertragbares, persönliches und beschränktes Recht auf Nutzung dieses Dokuments. Dieses Dokument ist ausschließlich für den persönlichen, nicht-kommerziellen Gebrauch bestimmt. Auf sämtlichen Kopien dieses Dokuments müssen alle Urheberrechtshinweise und sonstigen Hinweise auf gesetzlichen Schutz beibehalten werden. Sie dürfen dieses Dokument nicht in irgendeiner Weise abändern, noch dürfen Sie dieses Dokument für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen.

Mit der Verwendung dieses Dokuments erkennen Sie die Nutzungsbedingungen an.

gesis
Leibniz-Institut
für Sozialwissenschaften

Terms of use:

This document is made available under the "PEER Licence Agreement". For more Information regarding the PEER-project see: <http://www.peerproject.eu> This document is solely intended for your personal, non-commercial use. All of the copies of this documents must retain all copyright information and other information regarding legal protection. You are not allowed to alter this document in any way, to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public.

By using this particular document, you accept the above-stated conditions of use.

Mitglied der

Leibniz-Gemeinschaft

Accepted Manuscript

Title: Analysing the Employment Effects of Mergers and Acquisitions

Authors: Eero Lehto, Petri Böckerman

PII: S0167-2681(08)00051-6
DOI: doi:10.1016/j.jebo.2008.03.002
Reference: JEBO 2182



To appear in: *Journal of Economic Behavior & Organization*

Received date: 28-8-2006
Revised date: 26-2-2008
Accepted date: 4-3-2008

Please cite this article as: Lehto, E., Böckerman, P., Analysing the Employment Effects of Mergers and Acquisitions, *Journal of Economic Behavior and Organization* (2007), doi:10.1016/j.jebo.2008.03.002

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Analysing the Employment Effects of Mergers and Acquisitions* / Eero Lehto** and Petri Bäckerman***

* This paper is a part of the project financed by TEKES (National Technology Agency of Finland). The matched data that are used to produce the results can be accessed on site at the Research Laboratory of the Business Structures Unit of Statistics Finland. We are grateful to Mika Maliranta for comments. In addition, we would like to thank two anonymous referees and the co-editor for valuable comments and suggestions that have greatly improved the paper. Paul A. Dillingham and Debra Dove have kindly checked the English language. The usual disclaimer applies.

** Labour Institute for Economic Research.

*** Corresponding author. Labour Institute for Economic Research. Address: Pitkäsillanranta 3A, 6. krs. FI-00530 Helsinki, FINLAND. Phone: +358-9-25357330. Fax: +358-9-25357332. E-mails: eero.lehto@labour.fi and petri.bockerman@labour.fi

Abstract:

This paper examines the employment effects of mergers and acquisitions (M&As) by using matched establishment-level data from Finland. Our data register practically almost all M&As in all sectors. We compare the employment effects of cross-border M&As with the effects arising from two different types of domestic M&As and internal restructurings. The results show that cross-border M&As lead to downsizing in manufacturing employment. The effects of cross-border M&As on employment in non-manufacturing are much weaker. Changes in ownership associated with domestic M&As and internal restructurings also typically cause employment losses, but they exhibit an interesting sectoral variation.

JEL Codes: G34, J23, L23

Key words: mergers and acquisitions; M&As; takeovers; employment; workforce

1. Introduction

This paper uses matching methods to evaluate the employment effects of mergers and acquisitions (M&As). M&As are a key device to enlarge a purchasing firm in all developed countries. For instance, in Finland, hardly any significant restructuring of any industry has been carried out without ownership changes. The volume of cross-border M&As has increased at a rapid pace recently (Rossi and Volpin 2004), inspiring a lot of debate in Europe. In general, the attitude towards M&As has been rather positive because they restructure the economy, but cross-border M&As have been seen, as a threat to employment, especially in public debate.

Systematic micro-level evidence on the causal effect of M&As on employment is quite sparse despite the importance of the topic. The literature has mostly studied the effects of foreign acquisitions on productivity and wages (e.g. Bellak 2004). This paper contributes by analysing the employment effects of M&As on target firms by using matched establishment-level data from Finland. In this paper, we do not focus solely on cross-border or domestic M&As; rather we analyse the employment effects of several different types of M&As. We classify M&As as being either a cross-border M&A (in which the purchaser is a foreign company that is located abroad), a domestic M&A with a domestically-owned purchaser, a domestic M&A with a foreign-owned company that is located in Finland, or an internal restructuring in which the purchaser is not another company.

The Finnish case has a broader interest. Since Finland is a small open country, the enlargement of foreign ownership can have a more profound effect on employment in Finland than in large countries. The issue has been a subject of public debate recently because cross-border M&As have greatly increased in number following the removal of restrictions over foreign ownership during the

early 1990s. After establishing a Finnish affiliate, foreign firms have typically continued to enlarge through domestic M&As, especially in many service industries such as transport.

This paper deviates from the earlier ones regarding the data coverage, the definition of M&As, and the methods. Earlier research was focused on manufacturing, but its share has declined in developed countries. Our data also include services. The dynamics of employment may be different in non-manufacturing because services are less capital-intensive than manufacturing. It may well be that conclusions obtained earlier at least partly reflect their focus on the manufacturing sector. Furthermore, our data register practically almost all M&As, not only major M&As.

We use information on the actual events of different types of M&As to establish our definitions.¹ The interference of foreign firms and foreign ownership is then more accurately specified than in the studies that consider a registered change from domestic to foreign majority ownership. Most of the earlier papers (e.g. Conyon et al. 2002a, Gugler and Yurtoglu 2004) have relied on parametric methods. We use non-parametric, matching methods instead. Our data enable us to ensure that the control group to whom the establishments, which have been targets of different types of M&As, are compared with include only those establishments that have not been involved in any kind of M&As. This allows us to isolate the pure effects of different types of M&As.

In this paper, we discover that cross-border M&As lead to downsizing in manufacturing employment. The effects of cross-border M&As on employment in non-manufacturing are much weaker. Domestic M&As with a domestic purchaser, instead, have negative employment effects for all sectors. The impact of domestic M&As with foreign-owned purchasers is remarkably negative in construction and other services. In addition, internal restructurings have substantial negative

¹ Our data do not permit us to separate friendly and hostile takeovers from each other, which has been possible in some other papers (e.g. Conyon et al. 2001).

employment effects in trade (including hotels and restaurants). Taken together, our most important finding is that almost all changes in ownership lead to employment losses.

The paper proceeds as follows. Section 2 summarises the empirical literature, Section 3 discusses the theoretical arguments, Section 4 contains a description of our data, Section 5 describes the empirical framework, and Section 6 reports our results and the last section concludes.

2. Relevant empirical literature

Brown and Medoff (1988), Bhagat et al. (1990), and Lichtenberg and Siegel (1990) report the negative effects of M&As on employment in the USA. In contrast, McGuckin et al. (1995), McGuckin and Nguyen (2001), and Ollinger et al. (2005) discover some positive effects. Part of the evidence is based on very restricted samples of companies covering narrow segments of the US economy. For instance, Brown and Medoff use a sample of companies located in the state of Michigan.

The studies from Europe also report mixed findings. Conyon et al. (2001, 2002a, 2002b) discover the negative effects of M&As on employment in the UK by using data on 277 listed companies. The negative effects are particularly pronounced for hostile transactions. Girma and Görg (2004) find, by using data from the UK electronics industry, that the incidence of foreign takeover reduces employment growth, in particular for unskilled labour. Girma (2005) uncovers detrimental employment effects amongst larger foreign takeover targets in the UK, but beneficial impacts amongst smaller ones. Amess and Wright (2007) observe that management buyouts increase employment in the UK. Piscitello and Rabbiosi (2005) discover by using Italian firm-level data that, compared with firms that were not subject to any ownership change, companies targeted by foreign

investors marked an increase in the employment level a few years after the acquisition.² Bellak et al. (2006) find that foreign takeovers have no causal effect on employment growth among Austrian manufacturing firms. Margolis (2006) reports the negative employment effects of M&As from France, albeit only in the short term.

For Sweden, which has a small open economy much like Finland's, Siegel and Simons (2006) report for manufacturing firms that M&As lead to the downsizing of employment. Their linked employer-employee data do not include cross-border M&As separately. Hence, they are not able to compare the employment effects of different types of M&As (cross-border M&As vs. domestic M&As). Furthermore, Siegel et al. (2008) find that employment is reduced after ownership change by using data on Swedish manufacturing plants.

Gugler and Yurtoglu study the effect of M&As on employment in Europe and the USA and do not find any adverse effects of M&As on labour demand in the USA. However, for Europe the negative employment effect emerges. In particular, they report that European mergers reduce the demand for labour by about 10% on average, attributing this to more rigid labour markets in Europe. For that reason, firms are forced to use M&As in Europe as a restructuring device.

There are earlier studies on the effects of foreign acquisitions using Finnish data. All these papers have used data covering the manufacturing sector. They consider either productivity effects (Ilmakunnas and Maliranta 2004) or wage and education effects (Huttunen 2007). In particular,

² Gong et al. (2007) also discover that foreign acquisitions cause higher employment growth by using a sample of Chinese state-owned enterprises.

Huttunen shows that the share of highly educated workers declines, although slightly and slowly, after the ownership has changed from domestic to foreign in the acquired plants.³

3. Theoretical considerations

Recognizing the motives for M&As helps us to understand how M&As influence employment. The most important motives of M&As (e.g. Mueller 2003) are to

- 1) obtain genuine synergy gains (Farrell and Shapiro 1990),
- 2) utilize scales economies in various forms,
- 3) strengthen the market power in pricing,
- 4) revise the implicit agreements related to the firm's personnel and other stakeholders, and
- 5) promote the managers' own deviating interests.

An M&A creates synergy gains when the more efficient practices are extended to comprise the whole enlarged firm. In horizontal M&As the marginal costs of production in an inefficient firm typically decrease to the level that prevails in the more efficient party. Vertical M&As may intensify incentives to exert effort (Lehto 2006). Synergy-promoting M&As aim to increase productivity, perhaps also supporting employment. By raising efficiency, the parties of M&As become more competitive, which may help them to take over the market from their competitors.

It is not, however, evident that M&As, in general, tend only to internalize the benefits of genuine synergy gains. It is plausible that the parties of M&As often aim to use their assets jointly (including human capital) to obtain scale economies. Sharing assets is motivated by the cost

³ Furthermore, Pesola (2007) analyses the individual level employment effects of foreign acquisitions. Foreign acquisition is defined by Huttunen and Pesola based on the share of foreign ownership as being over 20 per cent. We use data on the actual events of different types of M&As instead.

savings. The downsizing of overlapping activities almost always involves reductions in the workforce.

M&As decrease the number of independent players, which concentrates the market. Salant et al. (1983) and Perry and Porter (1985) have shown that it does not pay to purchase another firm to decrease competition and to gain pricing power in the standard Cournot competition with constant returns to scale. When one introduces a non-linear cost function, the tendency to gain from the strengthened market power by higher prices will be part of horizontal M&As, and one can expect that M&As will reduce the scale of production and labour input, too.

Shleifer and Summers (1988) have argued that the change in control associated with, especially, hostile M&As offers an opportunity for a new management team to renege on implicit and explicit labour contracts that constitute obstacles to layoffs. Implicit labour contracts are often used to encourage firm-specific investments (e.g. Malcomson 1997). They are binding actions by the old owners and the old management team. The new management team that is put in place after an M&A is able to renege on implicit labour contracts and to reduce the amount of the workforce.

The idea that the managers engage in “empire building” has been regarded as one possible explanation for M&As (Schumpeter 1934, Marris 1963). The managers also deviate from the owner’s interests when they use “free cash” to undertake other firms, as hypothesized by Jensen (1986). These motives suggest a negative influence on the purchasing firm’s profits, but regarding the impact on employment, the forecast is unclear.

The effect of M&As on employment may be contingent on the type of M&As. The factors that matter are

- i) the distance between the target and acquiring firm (domestic or foreign in our study),
- ii) the nationality of the acquiring firm (domestic or foreign), and
- iii) the institutional nature of an acquirer (another firm or another form of M&A).

Research on the motives of M&As has suggested that information about the target firm may become more incomplete when the distance between the purchasing firm and the target firm increases (Lehto). This explains why most purchasers are located close to targets. For instance, in the largest and in the most extensive M&As in Finland, the purchaser has always been domestic. The better touch of the local markets has enabled profound rationalisation. Accordingly, radical structural reforms with considerable negative effects on employment are rather more often characterized by domestic M&As and, perhaps, internal restructurings than cross-border M&As. On the other hand, one can argue that for foreign owners it may be easier to loosen themselves from implicit contracts that preserve employment. For this reason cross-border M&As or domestic M&As in which the purchasing firm is foreign-owned may cause greater employment losses than other domestic M&As and internal restructurings.

All in all, the theory does not give a clear prediction about the employment effects. Hence, the net employment effect is an empirical matter. The negative effect seems, however, to be the most likely. Most authors argue for this view (e.g. Conyon et al. 2002a) and earlier studies have reported statistically significant negative effects, especially in Europe (e.g. Gugler and Yurtoglu).

We explore the effect of M&As on employment in three different industry blocks, which are

- a) manufacturing (including utility industries),
- b) construction and other services,⁴ and

⁴ Other services include transport, finance and insurance, real estate, renting and business activities, and personal services.

- c) trade (including hotels and restaurants).

Manufacturing is largely global, from which it follows that foreign firms are as equally present in the relevant market as domestic firms. Owing to this, in manufacturing the opportunities to benefit from the restriction of competition can be considered scarce in all types of M&As. In the service industries a domestic purchaser, being located in the same relevant market as the target firm, may have a greater interest than a foreign purchaser to buy another firm to limit competition. This especially concerns services such as retail trade, but not banking, finance and insurance, which are no less global than manufacturing. Because the service market is sometimes geographically restricted and because the joint use of assets may encounter geographical limits (Lehto), we expect that in the service sectors rationalisation through asset sharing and the downsizing of employment is more typical of domestic M&As than of cross-border M&As. Accordingly, in the service industries and in construction, domestic M&As have a larger negative impact on employment than cross-border M&As. Such a difference is not expected in manufacturing.

4. Data

Our data on M&As originate from the magazine *Talouselämä*, which is published on a weekly basis. M&As are defined as being based on an ownership share of at least 50%. The magazine reports all M&As in which either the acquiring or the acquired firm is a Finnish one, or in which either the acquiring or the acquired firm is owned by a Finnish company. The magazine covers all sectors. The only restriction is that the magazine *Talouselämä* does not keep a record of M&As in which either the acquirer's or the target's turnover is less than FIM 3 million (or around 510 000 Euros). We exclude a small number of firms that have been targets of M&As two (or more) times within a single year to avoid conflating the effects of different types of M&As on employment. We

have linked firms that have been subjects of M&As to their establishments. Hence, the analysis is done at the establishment level because different establishments that belong to the same firm may perform differently.⁵ In some cases only a certain establishment, not the whole firm, is purchased.

Different types of M&As that we analyse are cross-border M&As, domestic M&As with domestically-owned purchasers, domestic M&As with foreign-owned purchasers, and internal restructurings. Their exact definitions are given in Table 1. “Domestic” refers to a firm that is domestically located. A domestically located firm can then be either domestically-owned or foreign-owned. Hence, “foreign” has a dual meaning: first, it refers to the distance between the acquirer and the target firm, and second, it specifies the nationality of an acquirer’s owners from the target firm’s viewpoint. We classify internal restructuring into its own category because restructuring without the presence of another firm lacks some potential for synergy gains.

Table 1 around here

The number of establishments that were targets of M&As was 7923 over the period 1989-2003. Most of the establishments purchased were part of a domestic M&A, with 5369 such cases. In this total, 285 were cases in which a purchaser was a domestic (i.e. located in Finland) but the firm was foreign-owned. The number of cross-border M&As was 765 (roughly 10% of all M&As). The fact that domestic M&As are so much more numerous than cross-border M&As is interesting. It is not necessarily, however, typical only of Finland. This phenomenon becomes revealed in our data because it registers practically almost all M&As, not only major M&As.

⁵ “Establishment” refers to the physical location of a certain economic activity. Firms may consist of many establishments.

There is variation in the volume of M&As both across time and across sectors. (To compress the presentation in Figs. 1-2 all domestic M&As are added together; i.e. domestic M&As include M&As both with a domestically-owned and a foreign-owned purchaser.) The large spike in the number of domestic M&As in 1993 stems from the restructuring of the banking sector during the great depression (Fig. 1). Domestic M&As were most widely spread in the Finnish Savings Banks Group. There has been a substantial increase in the number of cross-border M&As during the latter part of the 1990s. Cross-border M&A activity has been most intensive in transport, the wholesale trade, and real estate, renting and business activities (Fig. 2). These particular sectors cover around 60% of all cross-border M&As. The difference in the incidence of cross-border M&As between manufacturing and services is interesting because earlier research has typically used data covering manufacturing.

Figures 1-2 around here

Matched data are assembled to obtain establishment-level variables that have a potential influence on the likelihood of being a target of an M&A and the evolution of employment after an incidence of M&A. (The variables are described in detail in Table 1.) Matching is made possible by the fact that the magazine *Talouselämä* lists the names of the companies that have been involved in M&As. Hence, it is possible to link the firm codes with the companies' names manually. We have used the trade register maintained by the National Board of Patents and Registration of Finland and the Business Register by Statistics Finland (SF) in this process. In complicated multi-plant M&As the additional information from the Business Register has been necessary to identify the parties of an M&A at the establishment level. The information about M&As is linked to the Business Register by the use of the firm codes. Firms can further be linked to their establishments by the use of registers maintained by SF. Employment, obtained from the Business Register, is measured as the average

number of employees in the establishment over the year. The matched data are linked to Employment Statistics, also maintained by SF, which compiles information on the economic activity of individuals and their background characteristics (such as education). Employment Statistics contains the plant code on the employee's employer in the last week of each year. As a result, it is possible to link Employment Statistics to other data sources maintained by SF.

5. Methodology

The features of M&As have implications for modelling. First, the selection of firms for targets is an important issue. Foreign companies tend to take over certain Finnish companies with particular observable characteristics. The results from Finnish data (Lehto) show that foreign companies tend to take over firms whose workers' education level is high, whose size is large, and who are exporters. Second, the adjustment of employment is not immediate, at least not in the manufacturing sector. Accordingly, we look at the effects of M&As on employment in time $t + 1$ and $t + 2$. The baseline for the employment level and for change in it is taken from $t-1$.

Propensity score matching aims to mimic a random experiment by constructing a control group from the group of untreated companies and ensuring that the control group is as similar as possible to the treatment group with respect to observable characteristics.⁶ In our case the treatment is a situation in which a firm has been a target of a particular type of M&A. To construct a control group for firms that have been targets of M&As over the period 1989-2003, we have included all domestic firms from the Business Register by SF that have a turnover of at least FIM 3 million (or around 510 000 Euros). This is the very same limit that is used by the magazine *Talouselämä* when it reports M&As. Because we analyse the effects of M&As on employment in $t+1$ and $t+2$, we

⁶ Caliendo and Kopeinig (2008) provide a survey of these methods.

require that controls also have to exist in the Business Register in $t+1$ and $t+2$. The controls are always chosen from the set of firms that have not been targets in any kind of M&A during time period $t-1, \dots, t+2$. For instance, we exclude those firms that have been subjects of domestic M&As when analysing the effects of cross-border M&As on employment.

Matching is conducted as follows. First, Probit models for being a subject of each type of M&A were separately estimated to construct the control group. The propensity scores give predictions for the likelihood of becoming a target of a particular type of M&A. Second, the employment level or change in it of those that have been a target of an M&A (i.e. the treatment group) was compared with the levels of those firms that have a similar propensity (based on the predictions of Probit models) to be in the pool of firms taken over by another firm, but are not currently in the pool of those firms (i.e. the control group). We use the program by Abadie et al. (2004) to perform exact matching on years and industries and the one by Leuven and Sianesi (2006) to conduct propensity score matching, kernel matching and the analysis of quality of matching.

The effect of a particular type of M&A on employment is evaluated based on the average treatment effect on the treated. Let $Y^i(W)$ be the outcome variable Y of establishment i . In our case the outcome variable is employment. W indicates whether establishment i has been a subject of M&As. (W is 1 when establishment i has been a subject of a particular type of M&A; otherwise it is 0.) $M^i(Y^j(0))$ indicates the average value of the outcome variable Y among the controls j that are chosen for the establishment i based on the predictions of Probit models. The average treatment effect on the treated that gives a quantitative magnitude for being a subject of a particular type of M&A in terms of employment is calculated by using the equation

$$(1) \quad \frac{1}{N^I} \sum_{i=0}^{N^I} [Y^i(1) - M^i(Y^j(0))]$$

where N^I is the number of firms that have been targets of a particular type of M&As. Time-variant and industry-specific unobservable factors, which have an asymmetric impact on the propensity score and on the outcome variable, can cause bias to the average treatment effect on the treated. For this reason and because there is a lot of variation in the volume of M&As across years and industries (as documented in Figs. 1-2), we used the formula (in the program by Abadie et al.)

$$(2) \quad \frac{1}{N^I} \sum_{i=0}^{N^I} [Y_{t,s}^i(1) - M^i(Y_{t,s}^J(0))],$$

where t is year and s refers to industry level, in exact matching. Exact matching on years and industries ensures that the controls for the targets of different types of M&As are selected from the same year and from the same industry.

The main emphasis of our study is on the difference-in-differences estimates. We estimate the average treatment effects on the treated for employment changes following Blundell et al. (2004) by using the formula

$$(3) \quad \frac{1}{N^I} \sum_{i=0}^{N^I} [(Y_{t_1,s}^i(1) - Y_{t_0,s}^i(1)) - (M^i(Y_{t_1,s}^J(0)) - M^i(Y_{t_0,s}^J(0)))],$$

where t_0 is a time point before the M&A and t_1 is a time point after the M&A. Difference-in-differences matching removes the fixed firm effects. The validity of the estimator rests on common time effects across groups and no systematic composition changes within the treatment and the control group.

6. Results

We present the results separately for manufacturing, construction and other services, and trade (including hotels and restaurants) because earlier evidence is mostly limited to manufacturing. (Primary production and electricity, gas and water supply from Fig. 2 are classified under manufacturing. “Trade (including hotels and restaurants)” includes the sale and maintenance of motor vehicles, retail trade, wholesale trade, and hotels and restaurants from Fig. 2.)

The likelihood of each type of M&A is explained with the Probit models by establishment-level variables.⁷ The values of the explanatory variables (Table 1) are taken from t-1. (Additional explanatory variables such as the capital intensity of production could be useful, but they are not available in our case.⁸) The appendix (Table A1), available on the JEBO website, reports the results for cross-border M&As because they are most interesting in the context of a small open economy.⁹ Cross-border M&As are more likely to occur for large establishments. The effect is strongest in manufacturing. Exporters are more likely to be involved in cross-border M&As. This effect is weakest in construction and other services. A high share of highly educated employees increases the likelihood of cross-border M&As. Accordingly, foreign acquirers often target Finnish firms with a lot of accumulated knowledge embodied in human capital. The education structure plays a much smaller role in the determination of domestic M&As (both types) compared with cross-border M&As. Older firms are more likely to be subjects of internal restructurings.

⁷ In the calculation of standard errors for firm’s age and whether it is an exporter or not, we have taken into account the fact that observations are clustered by firms because, otherwise, standard errors for them would be biased downwards.

⁸ In matching one need not control for all the observable factors at the same time, but it suffices to condition on the propensity score (i.e. the probability of treatment).

⁹ The earlier results regarding these effects are reported in detail in Lehto and Lehtoranta (2004) and Lehto (2006).

The matching results are reported as the average treatment effect on the treated (ATT), with employment changes based on the difference-in-differences estimator. The difference-in-differences matching gives reliable results of the effects of M&As on the employment change even when M&As that occur in time t have an effect on the employment level in $t-1$.¹⁰ The number of different types of M&As is somewhat smaller with the use of matching models than in Figs. 1-2 because we require that the establishments considered exist during the whole period from $t-1$ to $t+2$. In addition, explaining the employment change in $t+2$ means that we lose three years of data (1989, 2002 and 2003). This reduces, in particular, the number of cross-border M&As owing to the surge of cross-border M&As that occurred towards the end of our observation period. The number of M&As is also reduced with the use of matching models owing to non-availability of the control variables for some establishments from the registers of SF.

We report three sets of results for ATTs (Table 2). The first set is based on exact matching on years and industries with the nearest-neighbour matching method.¹¹ The matching on variables other than years and industries is based on propensity scores. These results constitute our preferred estimate because the number of M&As varies a lot between years and industries (Figs. 1-2), and exact matching on years and industries scales down the amount of bias associated with time-variant and industry-specific unobservable factors. When using the nearest-neighbour matching method one treated unit is always matched to five untreated units. The second set is based on propensity score matching with the nearest-neighbour matching method using the region of common support for the

¹⁰ Employment is measured as the average number of employees in the establishment over the year (Table 1). For this reason, we do not expect that M&As have large effects on the employment level at time t . In general, this is the case. The results for the employment level are reported in a working paper.

¹¹ We use the solely linear part of the prediction (Diamond and Sekhon 2005) when conducting exact matching on years and industries because the compression of the probability mass around the value of 0 and 1 could cause problems for matching.

scores.¹² In general, we do not lose observations by imposing the common support condition because the estimation of Probit models before matching typically deletes the outliers that are outside the common support.¹³ To check the validity of the matching, covariate balancing is tested. For all the variables the matching succeeds in making the means of the covariates close to each other for the treated and controls at the standard 5% level (Appendix A2).¹⁴ The third set of the results is based on the kernel method (Epanechenikov kernel). To illustrate the economic significance of the effects, the absolute number of employees in the target companies is reported (Appendix A3).

Table 2 around here

Based on exact matching on years and industries, cross-border M&As cause significant employment losses in manufacturing. This is largely in line with the findings of earlier studies (discussed in Section 2) that have mostly used data solely covering manufacturing, but in contrast with the results reported by Bellak et al. for Austrian manufacturing firms. The magnitude of the negative effect increases over time, being around 20% at time $t+2$. Employment decline of the magnitude of 20% means that the absolute number of employees in the average plant declines by 23 ($=0.20 \times 115$) persons at time $t+2$.¹⁵ For non-manufacturing there is little evidence of negative

¹² We follow the definition of common support in the Leuven-Sienesi program, where this is defined to include all controls and those treated whose propensity score is below the maximum or above the minimum propensity score of the controls.

¹³ In manufacturing for domestic M&As (with a foreign-owned acquirer) we lose four treated when imposing the common support condition. In addition, in manufacturing for domestic M&As (with a domestically-owned acquirer), we lose one treated.

¹⁴ Indicators for a firm's legal form, year dummies, industry dummies, and regional dummies are not reported in Appendix A2. The matching succeeds in making the means of the covariates close to each other for the treated and controls for these variables also.

¹⁵ Because the size distribution of the targets in terms of employment is skewed, the maximum effect ($225=0.20 \times 1128$) in manufacturing for cross-border M&As is much larger than the average effect (Appendix A3). For an estimate for the Finnish economy, the fact that the number of cross-border M&As in manufacturing has been 136 over the period has to be taken into account. Many of the plants in manufacturing are located in Eastern and Northern Finland, where the

employment effects, but for construction and other services, the results point to a negative employment change at time $t+2$. (For trade, including hotels and restaurants, there is some indication of employment gains at the 10% significance level at time $t+1$.) However, these effects almost vanish if we abandon the “exact matching” requirement. The results from propensity score matching and kernel matching (both without exact matching on years and industries) reveal the same underlying pattern, especially for manufacturing.

The employment effects of domestic M&As (with a domestically-owned acquirer) are substantially different from the ones that emerged for cross-border M&As. There are substantial negative (and statistically significant) employment effects for all sectors.¹⁶ This is consistent with our hypothesis that in the service industries a domestic purchaser, being located in the same relevant market as the target firm, may have a greater interest than a foreign one to buy another firm to limit competition. Because the service market is sometimes geographically restricted and because the joint use of assets (including human capital) may encounter geographical limits, we expected that in the service sectors the rationalisation through asset-sharing and the related downsizing of employment would be more typical of domestic M&As than of cross-border M&As. Accordingly, cross-border M&As have a larger negative effect on employment than domestic M&As (with a domestically-owned purchaser) in the manufacturing sector. The negative employment effects of domestic M&As (with a domestically-owned acquirer) are strongest for construction and other services. The effects are smaller for labour-intensive services (trade, hotels and restaurants) than for manufacturing, because in labour-intensive services there are fewer overall opportunities to downsize workforce.

small size of the local labour markets makes even the average effects regionally important. The effects are smaller for non-manufacturing.

¹⁶ We have studied the robustness of the results by dropping the financial sector from construction and other services because restructuring in the financial sector covered a large part of domestic M&As in the services in the early 1990s. The basic findings remain the same. In particular, when the financial sector is dropped from construction and other services for domestic M&As (with a domestically-owned acquirer), the results point to a negative employment change of -0.089 (with t -value of -2.85) and -0.107 (with t -value of -2.87), at time $t+1$ and $t+2$, respectively. The effect of the financial sector on the results for other types of M&As is even smaller.

The quantitative magnitude of employment losses from domestic M&As (with a domestically-owned purchaser) is quite similar to that reported by Gugler and Yurtoglu, according to which M&As in Europe reduce the demand for labour by about 10% on average. For instance, negative employment change is around 9% in an establishment in construction and other services at time $t+1$. The results for domestic M&As (with a domestically-owned acquirer) differ somewhat between different matching methods. Employment losses are typically largest when kernel matching is used.

The results of domestic M&As (with a foreign-owned acquirer) are based on a very small number of M&As. There are large negative employment effects in construction and other services, but in trade (hotels and restaurants) the effects are not statistically significant. The results from propensity score matching and kernel matching are similar in this respect. Internal restructurings hurt employment, too. Their effect is strongest in trade (including hotels and restaurants). There are some positive employment effects in construction and other services when exact matching on years and industries is used, but the effects disappear in propensity score matching and kernel matching. All in all, our results show that it is not solely cross-border M&As that have statistically significant, negative effects on employment.

7. Conclusions

This paper contributes to the literature by analysing the employment effects of M&As on targets by using matched establishment-level data from Finland over the period 1989-2003. In this paper, we focus not only on cross-border or domestic M&As, but we also analyse the employment effects of several different types of M&As. We classify M&As being either cross-border M&A (in which the purchaser is a foreign company that is located abroad), domestic M&A with a domestically-owned purchaser, domestic M&A with a foreign-owned company that is located in Finland, or internal

restructuring in which the purchaser is not another company. Hence, “foreign” has a dual meaning: first, it refers to the distance between the acquirer and the target firm, and second, it specifies the nationality of an acquirer’s owners from the target firm’s viewpoint. Our data register practically almost all M&As in all sectors.

We discover that cross-border M&As lead to downsizing in manufacturing employment. The effects of cross-border M&As on employment in non-manufacturing are much weaker. The separation of foreign acquirers by home countries would be an interesting topic for further research because it is possible that the employment effects vary according to the distance between the target and acquiring firm. Regarding the policy implications of our results for cross-border M&As, it is important to note that, at least within the EU, capital flows are restricted by competition law only. Accordingly, the scope for policy actions to preserve domestic manufacturing employment is limited. Domestic M&As with a domestic purchaser, on the other hand, have negative employment effects for all sectors. The effect of domestic M&As with foreign-owned purchasers on employment is remarkably negative in construction and other services. Internal restructurings that do not involve another company also tend to cause employment losses.

To sum up, the most important finding is that almost all changes in ownership lead to employment losses. That cross-border M&As have a negative impact only in manufacturing and that domestic M&As with foreign-owned purchasers have, however, a substantial negative impact on employment in construction and other services may emerge from the situation in which foreign interference in service industries develops in two stages: first, by establishing a bridgehead through a cross-border M&A, and after this, strengthening the dominance of the market through domestic M&As. The deep-going rationalisation of activities is typical only of the latter stage because deeper knowledge of the market has developed for a foreign player.

Our reading of the evidence is that the focus of the earlier research primarily on manufacturing (and listed companies) can deliver a seriously distorted picture of the adjustment of employment that takes place in broader industries. In particular, the negative effects of cross-border M&As on employment are almost non-existent in non-manufacturing. Furthermore, the negative effects of M&As on employment do not arise exclusively from cross-border M&As. The evidence therefore points out that cross-border M&As seem to be less specific regarding their effects on employment than has previously been thought. A prominent explanation for employment losses is that the change in control through M&As offers an opportunity for a new management team to renege on implicit labour contracts that have constituted obstacles for layoffs (Shleifer and Summers). Our results call for more studies that incorporate information from non-manufacturing sectors.

8. References

- Abadie, A., Drukker, D.M., Herr, J.L., Imbens, G.W., 2004. Implementing matching estimators for average treatment effects in Stata. *The Stata Journal* 4, 290-311.
- Amess, K. and Wright, M., 2007. The wage and employment effects of leveraged buyouts in the UK. *International Journal of the Economics of Business* 14, 179-195.
- Bellak, C., 2004. How domestic and foreign firms differ and why does it matter? *Journal of Economic Surveys* 18, 483-514.
- Bellak, C., Pfaffermayr, M., Wild, M., 2006. Firm performance after ownership change: a matching estimator approach. *Applied Economics Quarterly* 51, 29-54.

Bhagat, S., Shleifer, A., Vishny R.W., 1990. Hostile take-overs in the 1980s: the return of corporate specialization. *Brookings Papers on Economic Activity: Microeconomics*, 1-72.

Blundell, R., Costa Dias, M., Meghir, C., Van Reenen, J., 2004. Evaluating the employment impact of a mandatory job search assistance program. *Journal of the European Economic Association* 2, 569-606.

Brown, C., Medoff, J.L., 1988. The impact of foreign acquisition on labor. In: Auerbach, A. (Ed.). *Corporate Takeovers: Causes and Consequences*. Chicago: University of Chicago Press, 9-25.

Caliendo, M., Kopeinig, S., 2008. Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys* 22, 31-72.

Conyon, M.J., Girma, S., Thompson, S., Wright, P.W., 2001. Do hostile mergers destroy jobs? *Journal of Economic Behavior and Organization* 45, 427-440.

Conyon, M.J., Girma, S., Thompson, S., Wright, P.W., 2002a. The impact of mergers and acquisitions on company employment in the United Kingdom. *European Economic Review* 46, 31-49.

Conyon, M.J., Girma, S., Thompson, S., Wright, P.W., 2002b. The productivity and wage effects of foreign acquisition in the United Kingdom. *The Journal of Industrial Economics* 50, 85-102.

Diamond, A., Seklon, J.S., 2005. Generic matching for estimating causal effects: a general multivariate method for achieving balance in observational studies. *Mimeo*, Harvard University.

Farrell, J., Shapiro, C., 1990. Horizontal mergers: an equilibrium analysis. *The American Economic Review* 80, 107-126.

Girma, S., 2005. Safeguarding jobs? Acquisition FDI and employment dynamics in U.K. manufacturing. *Review of World Economics* 141, 165-178.

Girma, S., Görg, H., 2004. Blessing or curse? Domestic plants' employment and survival prospects after foreign acquisition. *Applied Economics Quarterly* 50, 89-110.

Gong, Y., Görg, H., Maioli, S., 2007. Employment effects of privatisation and foreign acquisition of Chinese state-owned enterprises. *International Journal of the Economics of Business* 14, 197-214.

Gugler, K., Yurtoglu, B.B., 2004. The effects of mergers on company employment in the USA and Europe. *International Journal of Industrial Organization* 22, 481-502.

Huttunen, K., 2007. The effect of foreign acquisition on employment and wages: evidence from Finnish manufacturing. *The Review of Economics and Statistics* 89, 497-509.

Ilmakunnas, P., Maliranta, M., 2004. Foreign medicine: a treatment effect analysis of the productivity effects of foreign ownership. *Applied Economics Quarterly* 50, 41-60.

Jensen, M., 1986. Agency costs of free cash flow, corporate finance and takeovers. *The American Economic Review* 76, 323-329.

Lehto, E., 2006. Motives to restructure industries – Finnish evidence from cross-border and domestic mergers and acquisitions. *Papers in Regional Science* 85, 1-22.

Lehto, E., Lehtoranta, O., 2004. Becoming an acquirer and becoming acquired. *Technological Change and Social Change* 71, 635-650.

Leuven, E., Sianesi, B. 2006. PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing, Boston College Department of Economics, Statistical Software Components No. S432001.

Lichtenberg, F.G., Siegel, S., 1990. The effect of ownership changes on the employment and wages of central office and other personnel. *Journal of Law and Economics* 33, 383-408.

Malcomson, J.M., 1997. Contracts, hold-up, and labor markets. *Journal of Economic Literature* 35, 1916-1957.

Margolis, D.N., 2006. Should employment authorities worry about mergers and acquisitions? *Portuguese Economic Journal* 5, 167-194.

Marris, R., 1963. A model of the ‘managerial enterprise’. *Quarterly Journal of Economics* 77, 185-209.

McGuckin, R.H., Nguyen, S.V., 2001. The impact of ownership changes: a view from labour markets. *International Journal of Industrial Organization* 19, 739-762.

McGuckin, R.H., Nguyen, S.V., Reznick, A.P., 1995. The impact of ownership change on employment, wages and labor productivity in US manufacturing 1977-1987. Center for Economic Studies, Washington D.C., US Bureau of Census, Working Paper No. 95-8.

Mueller, D.C., 2003. The finance literature on mergers: a critical survey. In: Waterson, M. (ed.). *Competition, Monopoly and Corporate Governance: Essays in Honour of Keith Cowling*. Cheltenham: Elgar, 161-204.

Ollinger, M., Nguyen, S.V., Blayney, D.P., Chambers, B., Nelson, K., 2005. Effect of food industry mergers and acquisitions on employment and wages. United States Department of Agriculture, Economic Research Report No. 13.

Piscitello, L., Rabbiosi, L., 2005. The impact of inward FDI on the local companies' labour productivity: evidence from the Italian case. *International Journal of the Economics of Business* 12, 35-51.

Perry, M.K., Porter, R.H., 1985. Oligopoly and the incentive for horizontal merger. *The American Economic Review* 75, 219-227

Pesola, H., 2007. Individual level employment effects of foreign acquisitions. Mimeo, Helsinki School of Economics and HECER.

Rossi, S., Volpin, P., 2004. Cross-country determinants of mergers and acquisitions. *Journal of Financial Economics* 74, 277-304.

Salant, S.W., Switzer, S., Reynolds, R.J., 1983. Losses from horizontal merger: the effects of an exogenous change in industry structure on Cournot-Nash equilibrium. *The Quarterly Journal of Economics* 108, 185-199.

Schumpeter, J.S., 1934. *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.

Siegel, D.S., Simons, K.L., 2006. Assessing the effects of mergers and acquisitions on firm performance, plant productivity, and workers: new evidence from matched employer-employee data. *Rensselaer Working Papers in Economics*, No. 0601.

Siegel, D.S., Simons, K.L., Lindstrom, T., 2008. Ownership change, productivity, and human capital: new evidence from matched employer-employee data. In: Dunne, T., Jensen, J.B., Roberts, M.J. (Eds.). *Producer Dynamics: New Evidence from Micro Data*. Chicago: University of Chicago Press, Forthcoming.

Shleifer, A., Summers, L., 1988. Breach of trust in hostile takeovers. In: Auerbach, A. (Ed.). *Corporate Takeovers: Causes and Consequences*. Chicago: University of Chicago Press, 33-56.

Table 1. Description of the variables

Variables	Definition/measurement
<i>Types of M&As:</i>	
Cross-border M&A	Cross-border M&As are defined as cases where the acquiring firm is foreign. “Foreign” here means that the firm, which is reported by the magazine <i>Talouselämä</i> to be the acquirer, is not located in Finland at the time of the M&A. (Source: the magazine <i>Talouselämä</i>)
Domestic M&A (Domestic owner, located in Finland)	We separate two types of domestic M&As based on ownership. (These types are added together in Figs. 1-2. First, there are domestic M&As, where the acquirer is domestically-owned and located in Finland.) (Source: the magazine <i>Talouselämä</i>)
Domestic M&A (Foreign owner, located in Finland)	Second, there are domestic M&As, where the acquirer is foreign-owned, but located in Finland. (Hence, cross-border M&As are defined as cases where transaction truly occurs across national borders.) (Source: the magazine <i>Talouselämä</i>)
Internal restructuring	Internal restructurings involve cases of transformation of a firm’s organizational form without the involvement of another company. For instance, management buy-outs that have been popular through the 1990s and a smaller number of cases where an individual Finnish investor is buying

	the firm belong to this category of M&As. (Source: the magazine <i>Talouselämä</i>)
<i>Establishment-level features:</i>	
Employment	A logarithm of the average number of employed persons in the establishment during the year. (Source: Business Register by SF)
The size of establishment	A logarithm of the number of employed persons. (Source: Business Register by SF)
The number of establishments	The number of establishments. (Source: Business Register by SF)
Firm's age	The age of a firm is measured in years. The base year is not dependent on firm's legal status. (Source: Business Register by SF)
Exporter	Firm is involved in export activity = 1, otherwise 0. (Source: Business Register by SF)
Share of highly educated (technical)	The share of highly educated employees with technical qualifications of the total number of employees in an establishment. (Source: Employment Statistics by SF)
Share of highly educated (other degrees)	The share of highly educated employees (excluding the number of highly educated employees with technical qualifications) of the total number of employees in an establishment. (Source: Employment Statistics by SF)
Share of employees with intermediate degrees	The share of employees with middle education in an establishment. Reference group for the education structure is made of those with comprehensive

	education only. (Source: Employment Statistics by SF)
The total number of establishments in the industry	The total number of establishments in the industry (21 subgroups) and in the same NUTS4 region.
The number of targets in the industry	The number of other establishments in the industry (21 subgroups) and in the same NUTS4 region that have been a target in any kind of M&A over the period 1989-2003.
<i>Indicators:</i>	
Firm's legal form	Legal form of firm consists of the following categories: corporation, general partnership, co-operative society and trader. (Source: Business Register by SF)
Years	15-1 (The temporal variation of different types of M&As is shown in Fig. 1.)
Regions	85 regional dummies based on NUTS 4 regions stipulated by the European Union.
Industries	21 industry dummies (Source: Business Register by SF). (The sectoral variation of different types of M&As is documented in Fig. 2.)

Fig. 1. The number of different types of M&As over the period 1989-2003. (Two types of domestic M&As are added together.)

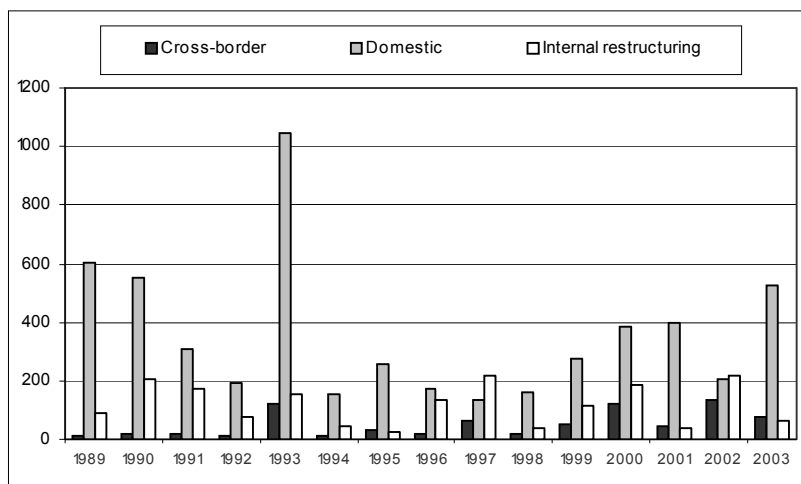


Fig. 2. The sectoral division of different types of M&As. (The figures are reported as sums over the period 1989-2003 and two types of domestic M&As are added together.)

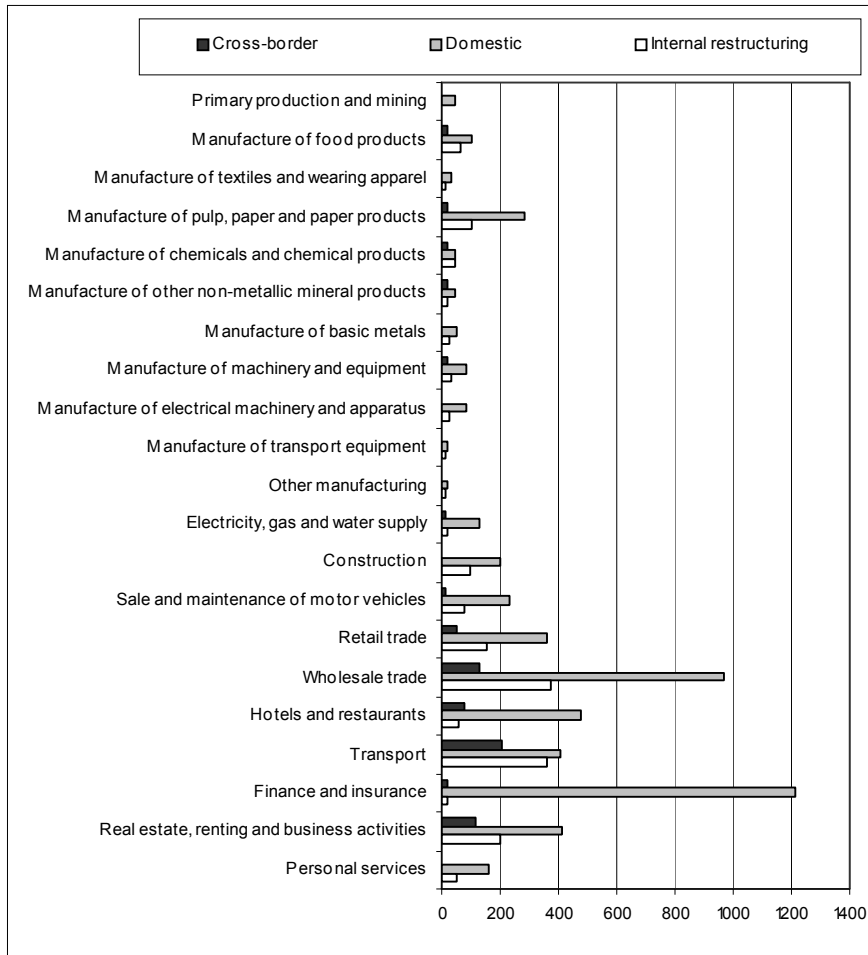


Table 2. The effect of M&As on the number of employees in the establishment.

Exact matching	Cross-border M&As			Domestic M&As (with domestically-owned purchasers)			Domestic M&As (with foreign-owned purchasers)			Internal restructurings		
	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)
Employment, $t - (t-1)$												
ATT	-0.112**	-0.006	-0.020	-0.039**	-0.041**	-0.045**	-0.045	-0.050	-0.032	-0.047**	0.106**	-0.068**
t-value	-2.51	-0.14	-0.66	-2.68	-2.59	-3.42	-0.84	-0.78	-0.37	-2.10	2.03	-3.20
Employment, $(t+1) - (t-1)$												
ATT	-0.176**	-0.051	0.074*	-0.085**	-0.092**	-0.059**	0.048	-0.320**	-0.123	-0.059*	0.101*	-0.078**
t-value	-2.97	-0.81	1.79	-3.71	-3.93	-3.02	0.42	-2.47	-1.01	-1.88	1.69	-2.61
Employment, $(t+2) - (t-1)$												
ATT	-0.220**	-0.164**	-0.000	-0.089**	-0.103**	-0.045*	-0.083	-0.297**	-0.191	-0.054	0.032	-0.148**
t-value	-3.21	-2.11	-0.01	-3.05	-3.67	-1.98	-0.66	-2.20	-1.49	-1.37	0.35	-3.84
Propensity score matching	Cross-border M&As			Domestic M&As (with domestically-owned purchasers)			Domestic M&As (with foreign-owned purchasers)			Internal restructurings		
	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)
Employment, $T - (t-1)$												
ATT	-0.112*	0.005	-0.043	-0.040**	-0.034	-0.056**	-0.077	-0.087	-0.063	-0.060*	0.000	-0.077**
t-value	-1.80	0.01	-0.77	-2.11	-1.55	-3.50	-0.72	-0.91	-0.51	-1.62	0.00	-2.06
Employment, $(t+1) - (t-1)$												
ATT	-0.177*	-0.020	0.038	-0.099**	-0.081**	-0.079**	-0.028	-0.375	-0.163	-0.059	-0.017	-0.088**
t-value	-1.92	-0.20	0.50	-2.63	-2.12	-3.09	-0.17	-1.71*	-0.93	-1.26	-0.23	-2.13
Employment, $(t+2) - (t-1)$												
ATT	-0.217**	-0.157	-0.021	-0.112**	-0.093*	-0.062*	-0.137	-0.353*	-0.255	-0.067	-0.093	-0.155**
t-value	-2.01	-1.12	-0.27	-2.69	-1.95	-1.96	-0.77	-1.67	-1.24	-1.01	-0.97	-2.52
Kernel matching	Cross-border M&As			Domestic M&As (with domestically-owned purchasers)			Domestic M&As (with foreign-owned purchasers)			Internal restructurings		
	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)
Employment, $T - (t-1)$												
ATT	-0.138**	-0.058	-0.091*	-0.058**	-0.047*	-0.076**	-0.116	-0.115	-0.109	-0.108**	0.003	-0.106**
t-value	-2.11	-0.79	-1.86	-2.44	-1.99	-4.12	-1.26	-1.23	-0.85	-3.41	0.05	-3.04
Employment, $(t+1) - (t-1)$												
ATT	-0.208**	-0.107	-0.036	-0.130**	-0.111**	-0.111**	-0.075	-0.413**	-0.228	-0.144**	-0.003	-0.144**
t-value	-2.42	-1.06	-0.55	-4.06	-3.04	-4.95	-0.47	-2.13	-1.26	-3.12	-0.04	-2.80
Employment, $(t+2) - (t-1)$												
ATT	-0.244*	-0.256*	-0.094	-0.161**	-0.141**	-0.102**	-0.205	-0.391*	-0.312	-0.179**	-0.112	-0.203**
t-value	-1.96	-1.90	-1.30	-3.87	-3.41	-4.97	-0.97	-1.81	-1.52	-3.05	-1.34	-3.25

The number of M&As	59	97	122	428	633	789	35	51	23	226	303	218
The number of potential controls	67 334	118 698	111 476	90 466	186 524	227 186	29 366	125 052	44 750	81 136	157 777	192 405

Note: Exact matching is conducted on years and industries with the nearest-neighbour matching method (matching on other variables than years and industries is based on propensity scores) using the program by Abadie et al. (2004), and propensity score matching with the nearest-neighbour matching method and kernel matching using the program by Leuven and Sianesi (2006). Robust t statistics are reported; * significant at 10%; ** significant at 5%. Robust t statistics in propensity score matching and kernel matching are calculated by bootstrapping (150 replications). The number of controls in the nearest-neighbour matching method is five in each case. ATT refers to average treatment effect on the treated.

Appendix A1. Probit estimates for cross-border M&As.

	Manufacturing	Construction and other services	Trade (hotels and restaurants)
The size of establishment (t-1)	0.186*** (5.68)	0.165*** (6.56)	0.079** (2.51)
The number of establishments (t-1)	0.003** (2.39)	0.000** (-0.76)	-0.001** (-2.86)
Firm's age (t-1)	-0.001 (-0.56)	0.005** (3.15)	-0.003** (-2.05)
Exporter (t-1)	0.385** (2.89)	0.332* (1.80)	0.930*** (10.49)
Share of highly educated (technical) (t-1)	1.408** (2.19)	0.453 (1.15)	1.741** (2.38)
Share of highly educated (other degrees) (t-1)	-0.027 (-0.04)	0.593** (3.17)	0.826** (2.62)
Share of employees with intermediate degrees (t-1)	0.177 (0.55)	0.170 (0.98)	0.278** (2.19)
The total number of establishments in the industry (t-1)	0.088 (1.44)	0.018 (0.38)	0.015 (0.32)
The number of targets in the industry (t-1)	-0.012* (-1.94)	-0.006** (-2.25)	-0.003* (-1.67)
Indicators:			
Firm's legal form	Yes	Yes	Yes
Years	Yes	Yes	Yes
Regions	Yes	Yes	Yes
Industries	Yes	Yes	Yes
The number of observations	67 393	118 795	111 598

Note: Robust z statistics are reported; * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix A2. Test of covariate balancing (% reduction of bias and t-test for the difference of means between the treated and the control group after matching in parentheses).

	Cross-border M&As			Domestic M&As (with domestically-owned purchasers)			Domestic M&As (with foreign-owned purchasers)			Internal restructurings		
	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)
The size of establishment	93.4 (-0.43)	98.8 (0.06)	55.1 (-0.70)	97.5 (-0.23)	93.5 (-0.30)	74.1 (-1.93)*	22.4 (0.86)	84.7 (0.36)	75.7 (-0.36)	96.5 (-0.28)	90.1 (-0.93)	91.6 (-0.38)
The number of establishments	71.3 (0.60)	94.5 (0.19)	92.2 (0.13)	99.7 (0.01)	97.6 (0.04)	99.5 (-0.02)	92.3 (0.26)	99.7 (0.09)	95.7 (-0.07)	82.3 (0.80)	86.0 (1.21)	97.0 (0.14)
Firm's age	19.9 (0.24)	81.2 (0.50)	-1114.1 (-1.04)	94.6 (0.30)	54.9 (-1.85)*	97.5 (-0.46)	-47.2 (-1.11)	79.4 (-0.45)	97.5 (-0.07)	90.1 (-0.43)	77.8 (-1.29)	90.2 (-0.54)
Exporter	99.2 (-0.06)	61.3 (0.73)	84.7 (-0.59)	99.3 (-0.04)	83.0 (-0.19)	70.5 (0.91)	97.3 (0.07)	31.1 (-0.13)	88.7 (-0.24)	93.1 (-0.56)	81.1 (-1.54)	98.1 (0.11)
Share of highly educated (technical)	81.5 (0.24)	95.5 (-0.06)	3.0 (0.17)	81.7 (-0.27)	-34.4 (0.33)	12.1 (-0.08)	99.8 (-0.00)	96.4 (-0.02)	..	41.1 (0.73)	-29.6 (-0.40)	41.3 (0.11)
Share of highly educated (other degrees)	66.1 (0.25)	86.2 (-0.33)	36.6 (-0.28)	66.8 (-0.12)	87.8 (-0.22)	97.3 (-0.19)	-40.2 (-0.15)	86.7 (0.19)	-18.6 (-0.26)	39.0 (0.84)	49.3 (0.63)	79.9 (0.07)
Share of employees with intermediate degrees	-69.6 (0.08)	86.1 (-0.17)	70.8 (0.24)	94.7 (-0.11)	57.9 (0.96)	97.6 (0.10)	72.7 (0.13)	65.3 (-0.22)	88.0 (-0.09)	97.4 (-0.10)	87.5 (-0.77)	-22.5 (0.52)
The total number of establishments in the industry	-18.7 (-0.58)	77.8 (-0.84)	70.1 (-0.49)	66.8 (-0.12)	83.4 (0.61)	82.8 (-0.97)	94.2 (-0.20)	90.8 (0.16)	-266.3 (-0.48)	-20.5 (-0.57)	93.1 (-0.60)	99.4 (-0.01)
The number of targets in the industry	91.3 (-0.23)	89.2 (-0.37)	79.1 (-0.37)	72.5 (0.66)	43.6 (-0.68)	51.1 (-1.19)	86.8 (0.30)	87.9 (-0.16)	-62.1 (-0.48)	97.9 (-0.08)	84.9 (-1.26)	79.1 (-0.16)

Note: Computations are based on the program by Leuven and Sianesi. Indicators for firm's legal form, year dummies, regional dummies, industry dummies are not reported. Significance: ** 5 %, * 10 %. For domestic M&As (with foreign-owned purchasers) in trade (including hotels and restaurants), the share of highly educated (technical) has been zero in all targets.

Appendix A3. Number of employees in the targets of M&As.

	Cross-border M&As			Domestic M&As (with domestically-owned purchasers)			Domestic M&As (with foreign-owned purchasers)			Internal restructurings		
	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)	Manufacturing	Construction and other services	Trade (hotels and restaurants)
Average employment over the years (maximum value)	115.4 (1128)	36.8 (389)	13.1 (210)	84.7 (3449)	17.7 (650)	10.6 (235)	23.9 (240)	19.6 (291)	11.2 (291)	91.8 (2475)	40.3 (4495)	40.3 (4495)